REMARKS

Claim 15 is currently pending in the application, claims 1-14 having been canceled without prejudice or disclaimer. By this amendment, claim 15 is amended for the Examiner's consideration. The foregoing separate sheets marked as "Listing of Claims" shows all the claims in the application, with an indication of the current status of each.

The Examiner has rejected claim 15 under 35 U.S.C. §112, second paragraph, for lack of antecedent basis in the limitation "for each back-to-back class". The foregoing amendment overcomes this ground of rejection by revising the first reference to "... for each class that is a back-to-back class". Note that "each class" has proper antecedent basis.

The Examiner has rejected claim 15 under 35 U.S.C. §101 as being directed to non-statutory subject matter. The claim has been amended, in accordance with current PTO practice, to clarify that the method of the invention is implemented by computer and that the steps of the method are performed by computer. Further, it will be noted that the case of *In re Bilski*, Docket No. 2007-1130, was decided by the Court of Appeals for the Federal Circuit ("CAFC") on October 30, 2008. The CAFC addressed the §101 standards for determining whether a claimed process is "new and useful" (*Bilski* slip opinion, p. 6) in light of the more particular concern distinguishing between a claim that seeks to pre-empt the use of a fundamental principle, on the one hand, and a claim that seeks only to foreclose use of a particular application of a fundamental principle, on the other hand (*Bilski* slip opinion, p. 8, citing *Diamond v. Diehr*, 450 U.S. 175 (1981) at 187). As stated by the CAFC, "*Diehr* can be understood to suggest that whether a claim is drawn only to a fundamental principle is essentially an inquiry into the scope of that exclusion; i.e., whether the effect of allowing the claim would be to allow the patentee to pre-empt substantially all uses of that fundamental principle" (*Bilski* slip opinion, p. 9).

The CAFC clearly understood the difficulty of this inquiry:

> "... the more challenging process claims of the twenty-first century are seldom so clearly limited in scope as the highly specific, plainly corporeal industrial manufacturing process of *Diehr*; nor are they typically as broadly claimed or purely abstract and mathematical as the algorithm in [*Gottschalk v. Benson*, 409 U.S. 63 (1972)]" (*Bilski* slip opinion, p. 10).

After noting this difficulty – and elsewhere acknowledging the importance of adapting to new developments – the CAFC adopted the test stated in *Benson* and reaffirmed in *Diehr*: "A claimed process is surely patent-eligible under §101 if: (1) it is tied to a particular machine or apparatus, or (2) it transforms a particular article into a different state or thing" (*Bilski* slip opinion, p. 10). This conclusion is consistent with current PTO practice. Nonetheless, the CAFC acknowledged that:

> "Nevertheless, we agree that future developments in technology and the sciences may present difficult challenges to the machine-or-transformation test, just as the widespread use of computers and the advent of the Internet has begun to challenge it in the past decade. Thus, we recognize that the Supreme Court may ultimately decide to alter or perhaps even set aside this test to accommodate emerging technologies. And we certainly do not rule out the possibility that this court may in the future refine or augment the test or how it is applied" (*Bilski* slip opinion, pp.14-15).

As indicated above, the claims have been amended to clarify the role of a computer in performing the steps, addressing the "machine" part of the "machine-or-transformation" test. It should be noted that the present invention depends for its operation on calculations that require use of a computer. It should also be noted that if the present invention is regarded as a "business method", the CAFC reaffirmed its conclusion in *State Street Bank v. Signature Financial Group*, 149 F3d 1368, 1375-76 (CAFC 1998) that business methods are not excluded from patentability (see *Bilski* slip opinion, p. 21).

In applying the "transformation" part of the "machine-or-transformation" test, the CAFC acknowledged that "[t]he raw materials of many information age processes, however, are electronic signals and electronically-manipulated data" (*Bilski* slip opinion, p. 25) and concluded that transformations of data in connection

with, and limited to, the representation of physical objects presents "no danger that the scope of the claim would wholly pre-empt all uses of the principle" (*Bilski* slip opinion, p. 26). In the present invention a stochastic model analysis is limited to a representation of a very physical situation involving real classrooms in physical locations with classes scheduled to be held in these classrooms at particular times.

In addition, it should be observed that the method described for the present invention is different in detail from other methods that may be applied in related but different circumstances. This becomes evident in the discussion, below, concerning the Examiner's §103 ground of rejection. The methodology of the present invention is designed to handle resource allocation and scheduling uncertainties of a commercial learning services environment, an environment that does not have the regularities associated with, for example, a university campus environment with regular grading periods and a full time faculty. Claim language that distinguishes between these different applications of "general problem solving principles" is in no danger of preempting these very "general problem solving principles." While it is true that any "process" can be expressed as an "algorithm" and equated to a "fundamental principle", this line of argument cannot sensibly be applied to the process described for the present invention which, because of the claim detail required to distinguish prior art, cannot raise a concern about preempting the application of any claim elements that – in themselves – may be among "general problem solving principles", such as stochastic analysis.

It is submitted, for all the above reasons, that the invention meets the §101 test enunciated in *Bilski*.

The Examiner has rejected claim 15 under 35 U.S.C. §103(a) as being unpatentable over the article "On Bridging the Gap Between Stochastic Integer Programming and MIP Solver Technologies" by Parija et al. ("Bridging the Gap – 2002") in view of the paper "Automating Class Schedule Generation in the Context of a University Timetabling Information System" by Sandhu ("Sandhu") and further

in view of the article "A Database Approach to Course Timetabling" by Johnson ("Johnson").

Inventor Parija is the author of Bridging the Gap – 2002. While this paper described the stochastic integer programming solver technology for enabling the solution of general problems, it emphasizes the importance of studying the underlying problem structure prior to describing the problem to the solver. It is therefore false to assert that the present invention is merely an application of the earlier paper, since the earlier paper does not, in fact, undertake to study the underlying problem structure of the present invention.

Further, the business problem described in the present invention and its attributes (such as back-to-back classes within a week, chained classes, cancellation probabilities for classes) are unique features that are NOT relevant for the university time-tabling work in the Sandhu dissertation. The problem discussed by the invention deals with complex course content granularity, time scales, and geographical location attributes, typically not found in the scope of university time-tabling problems in which the courses tend to be at the same campus, spanning a semester or other grading period, where the inter-dependent courses are nicely separated by a grading period break.

The notion of class cancellation probability described in the present invention is very different from "the percentage of clashes of subjects" as described in Sandhu's thesis. In the present invention, the cancellation probabilities results are due to either insufficient demand realization or the unavailability of required resources (i.e. qualified instructors and other technical resources) which are very much dictated by external market conditions. In the case of Sandhu's work, the clashes among the subjects are outcomes of the algorithm used.

Furthermore, the model described in the present invention is a revenue management model where the focus is on offering the right course at the right time at the right location in uncertain market conditions. This model would allow cancelling

classes at the last minute, with some penalty clause for the registrants. This is very different from the university time-tabling model described in Sandhu, where denying students certain classes in a term because of profitability concerns would likely be disruptive of student academic plans and therefore not acceptable in the university model.

It is to be noted that the Examiner's argument that Sandhu provides "equivalents to cancellation probabilities" is incomplete. In the present invention the model provides a "penalty cost" where a classroom (page 8, lines 8-10) or an instructor (page 7, lines 22-24) is unavailable for a desired class. No such cancellation factor is present in the Sandhu model, or suggested in Johnson.

Thus it should be clear that the Sandhu model is different from the model used in the present invention. The claims have been amended to make explicit the "penalty cost" element.

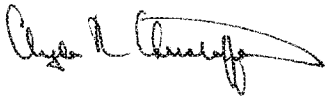
Finally, as to the Johnson reference, the Examiner concedes that neither Parija nor Sandhu specifically describe or disclose certain claimed calculations (of start dates for back-to-back classes, and classroom allocations for each class and for back-to-back classes). However, the Examiner simply cites to certain problem identification statements contained in Johnson. While this line of argument suggests problem elements recognized by the present invention, Johnson does not suggest a solution compatible with the present invention, any more than Parija or Sandu. Importantly, Johnson's disclosure is limited to the school environment, and does not account for the less constrained environment of the present invention. The supposition that Johnson's recognitions are solvable compatibly with the present invention by recourse to Parija or Sandu omits necessary connective tissue, since it is not evident that, within the more constrained environment disclosed in Sandhu, the solution techniques disclosed in Parija/Sandu are likely to yield the results claimed for the present invention.

In view of the foregoing, it is requested that the application be reconsidered, that claim 15 be allowed, and that the application be passed to issue.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at 703-787-9400 (fax: 703-787-7557; email: clyde@wcc-ip.com) to discuss any other changes deemed necessary in a telephonic or personal interview.

If an extension of time is required for this response to be considered as being timely filed, a conditional petition is hereby made for such extension of time. Please charge any deficiencies in fees and credit any overpayment of fees to Deposit Account 50-0510 (IBM-Yorktown).

Respectfully submitted,



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